

## **KYTC Hydrologic Calculation Software Recommendations**

### **July 8, 2010**

This list of hydrologic software is not intended to limit the use of other applications. Most hydrologic software applications will be accepted unless they are proven to be incorrect. For many off the shelf programs, the changes released in DR 400 will require designers to update their rainfall intensity and depth data on a project by project basis.

This list is intended to direct designers to other applications that can be used for hydrology calculations in the event that their current software applications will not meet the requirement specified in the new hydrology chapter DR 400.

#### **FHWA Hydraulic Toolbox**

KYTC Recommended Methods included: Rational

Website: <http://www.fhwa.dot.gov/engineering/hydraulics/software/toolbox.cfm>

The FHWA hydraulic toolbox is a freeware application that includes many small calculators to perform various drainage calculations. Among them is a rational calculator. It is not pre programmed with the NOAA Atlas 14 precipitation intensities specified in KYTC policy, and therefore will require manual input of the idf values.

There is also a time of concentration calculator included. The calculator includes all three components of the time of concentration: overland, shallow concentrated and channel flow. Check boxes allow the user to choose which components to use.

#### **KYTC Spreadsheet Applications**

KYTC Recommended Methods included: Rational, Regional Method

Website: <http://transportation.ky.gov/design/drainage/drainage.html>

KYTC has developed two different spreadsheet applications to calculate the rational and regional flow rates. The spreadsheets can be downloaded free of charge at the email address above. Contact Richard Thomas for more information.

#### **InRoads Storm & Sanitary**

KYTC Recommended Methods included: Rational, NRCS Unit Hydrograph

InRoads Storm & Sanitary offers rational calculations under the compute flow command. There is also a time of concentration calculator that includes overland, shallow concentrated and channel flow calculations. The designer has to provide velocities for the channel flow portion, which will require separate calculations using Manning's equation. The program also offers NRCS unit hydrograph calculations under the Pond Routing command.

#### **National Streamflow Statistics Program (NSS)**

KYTC Recommended Methods included: Regional Method

Website: <http://water.usgs.gov/software/NSS/>

The NSS program is a freeware application that performs all the Regional Calculation methods recommended for use in Kentucky (and the United States). The regional equations and their various exponents and coefficients are programmed into the application. The user selects the

region of interest from pull down menus and enters the required variable describing the physical characteristics of the watershed.

### **Win TR-55 & Win TR-20**

KYTC Recommended Methods included: NRCS Unit Hydrograph

Website: [http://www.wsi.nrcs.usda.gov/products/W2Q/H&H/Tools\\_Models/tool\\_mod.html](http://www.wsi.nrcs.usda.gov/products/W2Q/H&H/Tools_Models/tool_mod.html)

The Win TR-55 and Win TR-20 are freeware applications specifically designed by the NRCS to perform their unit hydrograph calculation procedures. Although the WIN TR-55 program will likely be capable of handling most hydrograph calculations required for a highway project, it does have some limitations. When these limitations are exceeded the Win TR-20 application should be used.

### **Hydrain-Hydo Module**

KYTC Recommended Methods included: Rational

Website: <http://www.gky.com/>

Hydrain is command line program that includes several different modules that are capable of performing many hydraulic and hydrologic calculations. The hydro module of hydrain is capable of performing rational calculations. It will perform overland and channel flow time of concentration values as well. The program does include regional calculations; however they are based on the previous version of the USGS regional equations which are no longer used by KYTC.

### **WMS (Watershed Modeling System)**

KYTC Recommended Methods included: Rational, Regional, NRCS Unit Hydrograph

Website: [http://www.ems-i.com/WMS/WMS\\_Overview/wms\\_overview.html](http://www.ems-i.com/WMS/WMS_Overview/wms_overview.html)

WMS is a robust hydrologic application that can be used for many different watershed calculations. It performs all KYTC recommended calculations and can estimate many of the parameters from digital terrain data. It contains time of concentration calculation procedures as well as the newest USGS regional calculations.